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RESEARCH ARTICLE

Stakeholder engagement in a sustainable sales and operations planning process

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Abstract

The purpose of this paper is to understand how companies can transition to a sustainable sales and operations planning process to improve economic, environmental, and social performance. Data are collected from a survey of 120 managers in China's manufacturing sector and analyzed using partial least square-based structural equation modeling. Drawing on life cycle theory and stakeholder theory, we argue that the conventional sales and operations planning (S&OP) process is internally focused and myopic, which over time leads to path dependencies and structural inertia. We find that firms can break free from this structural inertia by engaging external stakeholder groups that challenge the status quo and prompt organizational change. The paper contributes to theory by combining the key tenets of life cycle theory and stakeholder theory to explain how companies can transition to a sustainable S&OP process.

KEYWORDS

life cycle theory, sales and operations planning, stakeholder engagement, stakeholder theory, sustainable supply chain management

1 | INTRODUCTION

The aim of a conventional sales and operations planning (S&OP) process is to maximize operational efficiency while minimizing costs, with the ultimate goal of enhancing the firm's profitability (Goh & Eldridge, 2019; Swaim, Maloni, Bower, & Mello, 2016; Tuomikangas & Kaipia, 2014). To achieve this aim, the costs of operational inputs, including raw materials and labor, are kept to minimum whereas outputs are produced in line with detailed forecasts, thereby ensuring that supply matches demand (Ambrose & Rutherford, 2016; Dougherty & Gray, 1987). S&OP is defined as a process where tactical plans are developed to provide managers with the ability to strategically direct their businesses to achieve competitive advantage by integrating customer focused marketing plans for new and existing products with the management of the supply chain (APICS, 2017).

Although conventional S&OP processes were sufficient in an era of cost competition, consumer tastes are changing—as are the expectations of external stakeholders (Bansal, 2005; Berrone, Fosfuri, Gelabert, & Gomez-Meija, 2013). Consumers are increasingly demanding ethically sourced products that do minimal environmental harm (Blome & Paulraj, 2013; Giannakis & Papadopoulos, 2016; Gimenez, Sierra, & Rodon, 2012; Kong, Yang, Liu, & Yang, 2020). At the same time, external stakeholders including shareholders, governments, and nongovernmental organizations (NGOs) are putting increasing pressure on organizations to behave in an environmentally and socially responsible manner (Berrone et al., 2013; Chen & Sheu, 2009). Yet, the majority of scholars writing on S&OP still tend to focus on how firms can reduce costs and improve supply chain efficiency (Danese, Molinaro, & Romano, 2017; Oliva & Watson, 2011). What is rarely considered is how environmental and social performance concerns can be embedded in the S&OP process. The purpose

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of this paper is to answer the following research questions: (a) what are the predominant transitional factors that enable organizations to shift from a conventional to a sustainable S&OP (SS&OP) process? and (b) does an SS&OP process enhance the environmental, social and/or economic performance of the focal organization?

We explore these questions through the dual lens of life cycle theory (Cameron & Whetten, 1983; Greiner, 1972; Lacoursiere, 1980) and stakeholder theory (Freeman, 1984; Mitroff, 1983). Drawing on life cycle theory, we build the argument that the internally focused nature of a conventional S&OP process often leads to decisions that are myopic and path dependent (Schreyögg & Sydow, 2011). Over time, path dependency leads to structural inertia and a resistance to change within the organization (Sydow, Schreyögg, & Koch, 2009). Drawing on stakeholder theory, we suggest that structural inertia can be overcome by integrating the voice of external stakeholders in the S&OP process. External stakeholders are able to challenge decisions made during the S&OP process, leading to disruptive and pro-environmental and social change. We define SS&OP as a process that engages external and internal stakeholders in the development of a synchronized plan that matches supply with demand while balancing environmental, social, and economic factors.

The remainder of the paper is divided into five sections. Section 2 synthesizes the literature on life cycle theory, stakeholder theory, S&OP, and sustainable supply chain management to advance four hypotheses on the key enablers and performance benefits of an SS&OP process. Section 3 presents the research methodology, including a justification of the data collection and analysis methods. Section 4 tests the validity of our hypothetical model using data gathered from a survey of 120 managers working in China's oil and gas, agribusiness, consumer goods, pharmaceuticals, and equipment manufacturing industries. The data are analyzed using partial least square based structural equation modeling (SEM). Section 5 discusses the findings in relation to the literature. The paper concludes by outlining the study's theoretical and managerial contributions and highlights promising avenues for future research.

2 | LITERATURE REVIEW AND HYPOTHETICAL MODEL

2.1 | Life cycle theory

Life cycle theory suggests that organizations are composed of countervailing processes that strive for stability in the face of constant change (Rescher, 1996). Change is a disruptive event that is dramatic and externally driven and occurs due to a divergence from a state of equilibrium (Weick & Quinn, 1999). To achieve stability, organizations implement processes that provide structure and maintain organizational boundaries. These processes must be continuously adapted; this is because change events constantly seek to break down organizational structures and redefine boundaries (Van de Ven & Poole, 2005).

According to life-cycle theory, a developing organization has an underlying form that regulates the process of change and moves the

entity from a given point toward a subsequent end (Cameron & Whetten, 1983; Greiner, 1972; Van de Ven & Poole, 1995). Organizational change is defined as a difference in form, quality, or state over time in an organizational entity. That entity may be an individual's job, team, organizational subunit, the overall organization, or its relationship with other organizations (Van de Ven, 2013). Change is said to be imminent because the organizational entity has an underlying form, logic, and code that regulates the process of change and moves the firm from a given point of departure toward a subsequent end that is preconfigured in the present state (Van de Ven & Poole, 1995). Change is determined by measuring the same entity over two or more points in time on a set of characteristics and then observing these differences over time (Van de Ven, 2013).

The typical progression of change events in a life-cycle model is a unitary sequence that follows a single sequence of stages or phases—leading to growth or decline (Van de Ven, 2013). Organizational growth occurs when the sequence of stages are cumulative and predetermined (Grenier, 2016; Kimberly & Miles, 1980; Lacoursiere, 1980; Nisbet, 1970). Characteristics acquired in earlier stages are built upon in later stages, with each stage being related as it derives from a common underlying process (Van de Ven & Poole, 1995). Thus, life cycle theory positions organizational growth as a path dependent process (Schreyögg & Sydow, 2011; Sydow et al., 2009). Path dependence implies a tapering process, where the scope of actions undertaken by the organization dramatically narrows over time (Schreyögg & Sydow, 2011). So, decisions taken at one stage of development lead to a narrowing set of decisions in the next stage, and so on, until the organization becomes locked-in to a particular trajectory of development (Sydow et al., 2009). Over time, the organization loses its ability to change as structural inertia sets the organization upon a predetermined path that replicates inefficient solutions (Schreyögg & Sydow, 2011). To overcome this structural inertia and achieve change, an organization's processes must be challenged by external forces (Weick & Quinn, 1999).

2.2 | Stakeholder theory

Stakeholder theory asserts that the interests of internal and external actors should be considered when making strategic decisions (Freeman, 1984). The theory emerged in the early 1980s to counter the predominant neoliberal view at the time, which suggested that the strategic aim of the firm should be to create value for shareholders (Freeman & Reed, 1983; Mitroff, 1983). Stakeholder theory views the corporation as an organizational entity through which numerous and diverse participants accomplish multiple and not always congruent purposes (Donaldson & Preston, 1995). These participants are termed stakeholders; defined as the persons or groups that have, or claim, ownership, rights, or interests in a corporation and its activities, past, present, and future (Clarkson, 1995 p. 106).

Employees, shareholders, suppliers, and customers are considered primary stakeholders because if these groups become dissatisfied and withdraw from the corporate system, in whole or in part, the

organization will be seriously damaged and may be unable to function (Clarkson, 1995). The role of managers is to create sufficient value and satisfaction for primary stakeholder groups, so that each group continues as part of the stakeholder system (Clarkson, 1995; Freeman, 1984). Therefore, the firm is seen as a system of primary stakeholder groups, where a complex set of relationships exists between and among interest groups with different rights, objectives, expectations, and responsibilities (Clarkson, 1995). Secondary stakeholders are defined as those individuals or groups who influence, affect, or are influenced by the organization, but are not engaged in transactions with the organization and are not essential for its survival (Savage, Nix, Whitehead, & Blair, 1991 p. 61). According to this definition, the media, governments, and NGOs are considered secondary stakeholders (Van Wassenhove, 2006). These groups have the capacity to mobilize public opinion in favor of, or in opposition to, an organization's activities (Bansal, 2005).

There is a growing consensus in the literature that organizational entities need to significantly change the way they do business—and this change requires engagement with external stakeholder groups (Bennis, Benne, & Chin, 1985; Doppelt, 2003; Dunphy, Griffiths, & Benn, 2003; Kotter, 2012; Pettigrew & Whipp, 1993). Scholars are calling for firms to move beyond a singular focus on financial performance towards a consideration of the organization's impact upon the environment and society—what has been termed corporate sustainability (Amini, Bienstock, & Narcum, 2018; Bansal, 2005). Corporate sustainability is defined as the contribution of business firms to sustainable development (Bansal, 2005; Dyllick & Hockerts, 2002). Corporate sustainability occurs when the environment and society become an important part of firm's business strategy and are seen to provide a potential competitive advantage (Dunphy et al., 2003). Companies are considered sustainable when they simultaneously attain environmental integrity, contribute to social equity, and add to economic prosperity (Bansal, 2005). The organization still pursues the traditional business objective of profitable returns but voluntarily goes beyond this by actively promoting environmental sustainability values and practices in society (Dunphy et al., 2003; Dyllick & Hockerts, 2002). The organization's fundamental commitment is to facilitate the emergence of a society that supports the environmental viability of the planet and contributes to just and equitable social practices (Amini et al., 2018; Dunphy et al., 2003; Harris, 2007).

Internal and external stakeholders play a pivotal role in prompting sustainable change in organizations (Daddi, Todaro, De Giacomo, & Frey, 2018; Harris, 2007; Shrivastava & Hart, 1995). Environmental management and sustainable development require organizational entities to acquire knowledge that is not ordinarily found in their existing repertoire or experience (Clarke & Roome, 1999; Gilal et al., 2020). Companies participate in collaborative action that links traditional business issues to a set of environmental and social concerns (Delmas & Toffel, 2004). The development of social and environmental knowledge requires the involvement of a broad set of actors with an interest in a company's activities (stakeholders) including strategy, operational processes, environmental management, and sustainable development (Clarke & Roome, 1999; Delmas & Toffel, 2004). We

now explore how stakeholders can act as a force for environmental and social change by considering the conventional, and then sustainable, S&OP process.

2.3 | Conventional S&OP

Through the dual lens of life cycle theory and stakeholder theory, conventional S&OP can be conceptualized as a sequential process of connected stages which is limited to the involvement of internal stakeholders (employees and managers). As decisions taken during a conventional S&OP process are made by a company's employees, the process tends to be inward looking. Such myopic decision making creates a predetermined, path dependent process (Schreyögg & Sydow, 2011). Over time, path dependence leads to structural inertia within the organization and a resistance to change (Sydow et al., 2009). To break free of this structural inertia, processes must be challenged by external forces, such as external stakeholder groups (Weick & Quinn, 1999). Stakeholder theory would suggest that external stakeholders are well positioned to challenge the decision-making process of conventional S&OP to stimulate disruptive change in the form of pro-environmental and social responses (Hart & Milstein, 2003).

S&OP emerged in the late 1980s and early 1990s in response to the disconnection between organizational entities (Ling & Goddard, 1989; Proud, 1994). Often, an organization's sales, marketing, and operations departments are said to operate in silos with limited coordination and communication between functions (Grimson & Pyke, 2007; Ivert, Dukovska-Popovska, Fredriksson, Dreyer, & Kaipia, 2015; Noroozi & Wikner, 2017). Sales managers make decisions according to market share and profit margins, whereas production managers prioritize material efficiency, capacity utilization, and production costs (Feng, D'Amours, & Beauregard, 2008). A common problem with this compartmentalized approach is that demand forecasts, production plans, and production schedules change constantly, and the lack of coordination leads to individuals moving in different, and sometimes opposing, directions (Ivert & Jonsson, 2014; Proud, 2012). Since its emergence, the aim of the S&OP process has been to match supply with demand by providing a process for the vertical alignment of business strategy and operational planning and for the horizontal alignment of demand and supply plans (Ling & Goddard, 1989; Tuomikangas & Kaipia, 2014). In a conventional S&OP process, forward demand plans are synced with operational plans on a horizon of less than 3 months to over 18 months (see Ivert & Jonsson, 2014; Kaipia, Holmström, Småros, & Rajala, 2017).

Three dimensions are said to determine the effectiveness of the conventional S&OP process; collaboration, information technology (IT), and integration (Danese et al., 2017; Grimson & Pyke, 2007; Thomé, Scavarda, Fernandez, & Scavarda, 2012a). Collaboration refers to the willingness of different departments to work together to implement an effective sales and operations plan (Hadaya & Cassivi, 2007; Thomé et al., 2012a; Thomé, Scavarda, Fernandez, & Scavarda, 2012b). Collaborative planning within an organization

enhances communication, trust, and teamwork; elements that determine the strength of a company's relationship with its employees (Oliva & Watson, 2011; Wallace, 2010). Scholars argue that the willingness to collaborate should be supported by coordination mechanisms that facilitate interorganizational communication and information sharing by linking different functional areas (i.e., sales, marketing, finance, and operations; Affonso, Marcotte, & Grabot, 2008; Feng et al., 2008; Ivert & Jonsson, 2014; Nakano, 2009; Oliva & Watson, 2011). If coordination mechanisms (i.e., integration) are not present, firms have difficulty observing the benefits of intraorganizational and interorganizational collaboration (e.g., Grimson & Pyke, 2007; Hofman, Blome, Schleper, & Subramanian, 2020; Thomé et al., 2012a). Indeed, integration is considered a key dimension of S&OP because it requires that organizations go beyond effective communication and information sharing toward the pursuit of a common goal (Goh & Eldridge, 2019; Oliva & Watson, 2011). Integration during the S&OP process is enabled by IT systems that enable firms to quickly adopt and offer solutions that optimize both sales and operations decision making (Grimson & Pyke, 2007; Lapide, 2004b). An integrated IT platform is said to provide information transparency with all stakeholders involved in the process (Collin & Lorenzin, 2006). Yet although these authors call for better integration in systems and processes, the role of external stakeholders in the S&OP process is rarely explored. We examine this gap in the literature by considering how external stakeholders can be integrated in the S&OP process.

2.4 | External stakeholders engagement in an SS&OP process

External stakeholder groups are putting increasing pressure on organizations to behave in an environmentally and socially responsible manner (Berrone et al., 2013; Dey et al., 2020). For example, consumers are increasingly demanding ethically sourced products that do minimal damage to the environment (Giannakis & Papadopoulos, 2016). Some consumer groups advocate that supply chains are audited by independent third parties, such as the Fair Trade Association (Yalabik & Fairchild, 2011). Corporate customers may also require that suppliers provide written certification of compliance to environmental standards, such as ISO 14000 (Delmas & Toffel, 2008). Shareholders may require firms to demonstrate their environment and social credentials by joining sustainability indices, such as the Dow Jones Sustainability Index (López, García, & Rodríguez, 2007).

Other external stakeholders, such as national governments, are imposing regulations that are prompting firms to improve their environmental performance through the adoption of new pollution prevention technologies (Chen & Sheu, 2009; Hart & Ahuja, 1996; Tan, Chung, Shi, & Chiu, 2017). Pressure is also coming from NGOs and environmental activist groups that bring media attention to poor environmental practices in the supply chain (Berrone et al., 2013; Dubey et al. 2017; Hart & Ahuja, 1996). These groups can mobilize public opinion in favor of, or against, a firm's environmental and social

activities (Sarkis, Gonzalez-Torre, & Adenso-Diaz, 2010). Examples include Greenpeace's campaign against the use of programmed obsolescence in smartphones, and the Rainforest Alliance's battle against the clearcutting of Indonesia's natural forests (Reid & Toffel, 2009). Many of these campaigns have attracted the attention of consumers and negatively influenced purchasing behaviors (Grappi, Romani, & Barbarossa, 2017). Community-based stakeholders give firms a social license to operate and can directly influence an organization's decision to adopt pro-environmental and social practices (Gunningham, Kagan, & Thornton, 2004).

An S&OP process that integrates external stakeholder perspectives prompts firms to prioritize a balance between the three aspects of the triple bottom line (TBL): economic, environmental, and social performance (Elkington, 1998; Savitz & Weber, 2013). Whereas conventional S&OP aims for stable processes that effectively match supply with demand, an SS&OP process strives for flexibility to meet the changing needs of external stakeholder groups. Admittedly, developing an SS&OP process is complex and requires intensive planning and coordination. As Meppem and Gill (1998) argue, "planning for sustainability requires explicit accounting of perspective (world view or mind-set) and must involve broadly representative stakeholder participation through dialogue" (p. 134). An SS&OP process would therefore need to provide harmonization between demand forecasting, sourcing, production, distribution, and finance, as well as sustainability elements. For example, when creating forecasts, marketing managers would need to consider a variety of future scenarios including changing customer preferences regarding environmentally responsible and ethically sourced materials (Ginsberg & Bloom, 2004; Lin & Niu, 2018). Operations' managers would need to consider how to reduce waste and raw material consumption, increase worker well-being, and implement plans to recover products at end-of-life. The supply management function would need to integrate suppliers in the planning process as suppliers often oversee the majority of the manufacturing and distribution process (Krause, Vachon, & Klassen, 2009).

Coordination between internal and external stakeholders would also require the development of collaborative capabilities (Halal, 2001; Huxham, 1993; Tencati & Zsolnai, 2009). Collaborative capabilities are evidenced when two or more organizational entities have the capacity and readiness to share knowledge and work together (Huxham, 1993). Collaboration between internal and external stakeholders in an SS&OP process would include the sharing of information, resources, and responsibility to jointly plan, implement, and evaluate environmentally and socially responsible processes in order to achieve a common goal (Camarinha-Matos, Afsarmanesh, Galeano, & Molina, 2009). Collaboration between stakeholders implies sharing risks, resources, responsibilities, losses, and rewards, creating a shared identity between the participating groups (Lozano, 2008, 2015). Collaboration also requires the mutual engagement of participants to solve a common problem together, which implies trust and dedication (Camarinha-Matos et al., 2009). By fostering collaboration between internal and external stakeholders during the S&OP process, the organization is prompted to consider the effects of its supply chain on the environment and on the communities in which it

operates. Drawing together this line of reasoning, we hypothesize the following:

- H1.** An SS&OP process is enabled by organizational planning activities that integrate the views of internal and external stakeholder groups.
- H2.** An SS&OP process is enabled by collaboration between the internal functions of the firm and external stakeholder groups.

Collaboration on environmental and social issues requires visibility and transparency of supplier activities across the extended supply chain (Hofman et al., 2020; Klassen & Vachon, 2003; Luo, Chong, Ngai, & Liu, 2015). Collaborative processes are fundamental to solving operational problems and should be supported by advanced software that facilitates information exchange (Klassen & Vereecke, 2012; Lapide, 2004b). Sophisticated IT tools can recommend changes for improving existing demand and supply plans and can optimize both sales decisions (e.g., pricing) and operations decisions (e.g., production schedules; Grimson & Pyke, 2007). Because integrated IT tools increase visibility at each stage of the supply chain, managers can monitor supply chain activities and take proactive action before environmental or social issues occur. Carter and Rodgers (2008) suggest that information systems enhance transparency among stakeholders and facilitate seamless information exchange within and across firms. Improving the monitoring and evaluation of the economic, environmental, and social impacts of business activities enhances transparency at each stage of the supply chain (Melville, 2010; Wang, Tai, & Wei, 2006). Thus, having an integrated IT system with key external stakeholders is necessary for the effective coordination of an SS&OP process. We therefore hypothesize the following:

- H3.** An SS&OP process is enabled by an integrated IT system between the firm and key external stakeholders groups.

Management scholars argue that a socially minded firm can improve the quality of life and well-being of its employees by creating jobs and revitalizing communities (Porter & Kramer, 2011; Savitz & Weber, 2013). This “shared value” approach suggests that firms

achieve economic advantages by investing in local communities to train and develop the talent of future employees (Porter & Kramer, 2011). Corporations that consider society and the environment in the strategic planning process have been found to have higher average sales growth, return on assets, and cash flows than companies that are solely focused on economic objectives (Ameer & Othman, 2012; López et al., 2007).

Moreover, close environmental collaboration between buyers and their supply chain partners has been shown to enhance competitiveness (Blome & Paulraj, 2013; Cheng, 2011; Klassen & Vachon, 2003; Luo et al., 2015). Environmentally responsible corporate activities can enhance corporate reputation, customer relationships, and product quality, leading to improvements in economic performance (Ameer & Othman, 2012). Furthermore, including sustainability elements within business processes allows firms to avoid risks, such as costly legal action if the firm does not comply with environmental regulations (Carter & Jennings, 2004; Lozano, 2018). Collaboration with external stakeholders has been found to positively improve each aspect of the TBL: social, environmental, and economic performance (di Norcia, 1996; Gimenez et al., 2012; Savitz & Weber, 2013; Stanwick & Stanwick, 1998). We therefore hypothesize the following:

- H4.** An SS&OP process will positively improve a firms' (a) financial performance, (b) social performance, and (c) environmental performance.

Figure 1 presents a theoretical model of the enablers of an SS&OP process and its effect on TBL performance.

3 | METHODOLOGY

We tested the validity of our theoretical model using an empirical survey with standard scales derived from the literature (Hadaya & Cassivi, 2007). Our instrument has two main sections. The first section obtained general information, including respondent's position within the firm, firm size, and industry. We also included two optional, open-ended questions regarding the challenges that managers face in implementing S&OP and the pressures they experience stemming from

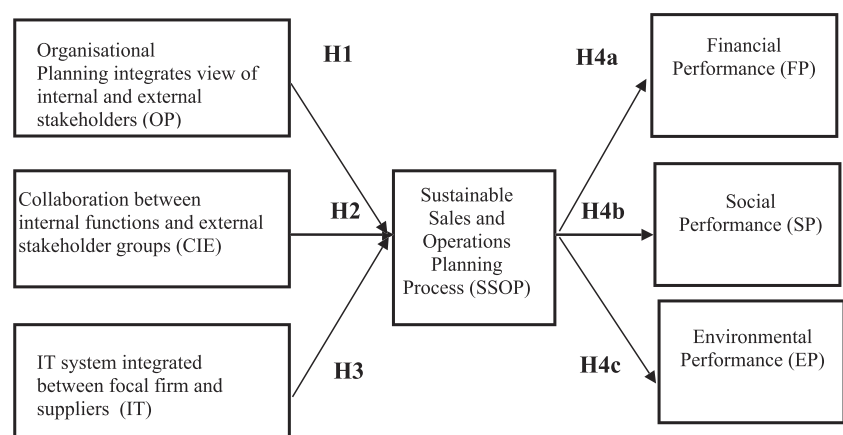


FIGURE 1 Sustainable sales and operations planning process and performance model

external stakeholders to improve TBL performance. The second section of the instrument focused on the seven constructs of the research model, namely, organizational planning, collaboration, IT system, external stakeholder integration, financial performance, social performance, and environmental performance. According to Narasimhan and Das (2001), obtaining objective operational and financial data on a firm is generally difficult. This suggests that obtaining objective information and measuring the economic, social, and environmental performance of a firm was likely to prove even more difficult. We therefore followed previous supply chain management survey research that relied on subjective measures of performance and operational practices from survey participants (e.g., Hadaya & Cassivi, 2007). Each item in the survey was assessed using a 7-point Likert scale (1 = *strongly disagree* and 7 = *strongly agree*).

3.1 | Data collection

Web-based surveys are a powerful tool for survey research (Sills & Song, 2002 p. 22). Our study used e-mail for data collection, with targeted participants receiving a cover letter with general information concerning the purpose of the research and a link to the survey. Our sample targeted professionals in middle and senior management positions in the Chinese primary and secondary sectors (including manufacturing allied retailing services) including directors of sales and marketing, supply chain managers, production managers, and procurement managers. The main reason for this choice was that S&OP requires intraorganizational participation that is both horizontally diverse across all functional areas (namely, sales, marketing, production, and the supply chain) and vertically diverse, involving different hierarchical levels in the organization, from middle management to senior leaders (Goh & Eldridge, 2019; Thomé et al., 2012b). The

survey was sent to individuals in China's oil, gas, and petroleum industries; agribusiness; materials and chemicals; consumer goods; consumer electronics; luxury goods; pharmaceuticals; and machinery and equipment manufacturing. China's primary and secondary sectors were selected because of their record of environmental pollution including the highest reported levels of carbon dioxide emissions in the world (Statista, 2017). These sectors were also selected because of high levels of workplace accidents that have led to thousands of worker fatalities (ChinaDaily.com, 2019).

During a 4-week period, from June to July 2017, the questionnaire was distributed to 650 participants who were identified as possible S&OP process actors according to the aforementioned selection criteria. All potential respondents were assured that their participation in the questionnaire was anonymous and voluntary. To improve the response rate, a nonmonetary incentive was offered, namely, a copy of the final survey findings. A total of 145 surveys were returned, for a response rate of 22.30%. Of the 145 returned surveys, 25 were excluded because of missing responses. Finally, we had 120 useful responses with an 18.46% valid response rate, which is close to the recommended level of 20% for this type of survey (Malhotra & Grover, 1998).

The overall response rates of the optional questions were 67% and 43%. The sample comprised a wide variety of managers that closely reflected the composition of the population of professionals to whom the survey was initially sent. The majority of the respondents (101 of 120) were supply chain managers (59.2%), operations managers (15%), and purchasing managers (10%). Managers from other functional areas (sales, marketing, and finance) were solicited to participate in the survey, but their response levels were lower. The diversity of the sample strengthens the external validity of the study results (Hair, Ringle, & Sarstedt, 2011). Table 1 presents the respondent characteristics.

TABLE 1 Respondent characteristics

Industry sector	N	(%)	Respondent's position	N	(%)
Oil/gas/petroleum	19	15.8	Supply chain manager	71	59.2
Consumer goods	19	15.8	Operations manager	18	15.0
Consumer electronics	13	10.8	Purchasing manager	12	10.0
Machinery and equipment	11	9.2	Sales manager	9	7.5
Pharmaceuticals	11	9.2	Finance manager	4	3.3
Materials and chemicals	8	6.7	Marketing manager	2	1.7
Automotive	6	5.0	Other titles	4	3.3
Healthcare and medical devices	6	5.0	Total	120	100
High-tech	5	4.2			
Agribusiness	3	2.5	Size (# of employees)	N	(%)
Luxury goods	3	2.5	5,000 or more	42	35.0
Retailing	9	7.5	1,001–5,000	23	19.2
Others	7	5.8	501–1,000	22	18.3
			151–500	20	16.7
Total	120	100	150 or less	13	10.8
			Total	120	100

3.2 | Variables

As in conventional S&OP, an SS&OP process amalgamates demand forecasting, sourcing, production, distribution, and financial plans while adding environmental and social elements. When forecasting customer demand, firms consider a range of scenarios including volatile market conditions (e.g., pricing fluctuations), evolving customer requirements for ethically and environmentally sourced products, as well as competitor activities. The role of finance in the planning process is therefore crucial, because it helps marry the operational plans with the financial goals of the firm (Chase, 2013; Lapide, 2004a).

Our SS&OP construct includes planning for production, sourcing, delivery and financial options, and external stakeholder integration. We extrapolated eight variables based on a conventional S&OP planning process, including transportation status, delivery capability (Hadaya & Cassivi, 2007), inventory (Hadaya & Cassivi, 2007; Nakano, 2009), sales and demand forecasting (Feng et al., 2008), supplier production capacity (Affonso et al., 2008; Feng et al., 2008; Milliken, 2008), budgetary restrictions (Grimson & Pyke, 2007), operational resources (Nakano, 2009), purchasing data, and information on suppliers (Nakano, 2009). Moreover, we considered collaboration within the S&OP process because it leads to increased communication and socialization among individuals, functions, and other companies (Tuomikangas & Kaipia, 2014). The scales used for collaboration include meetings with main supply chain partners (M1) and cross-functional meetings (M2; Ambrose, Matthews, & Rutherford, 2018; Grimson & Pyke, 2007). IT integration between the focal firm and its suppliers was measured using the following scales: real-data integration software (Grimson & Pyke, 2007), IT-enabled transparency (Soh & Goh, 2007), and sustainability information systems (i.e., enterprise sustainability planning). Finally, integration between all functional plans was captured by the presence of a framework of goals, procedures, key performance indicators, shared ideas, information, and resources on sustainability (INT2; Savitz and Weber, 2013).

With respect to the environmental and social aspects of an SS&OP process, we used scales that included flexibility of processes and their alignment with external stakeholders. For example, sustainability integration included the alignment of all the plans related to sustainability goals and procedures and key performance indicators related to shared ideas, information, and resources (Savitz & Weber, 2013). Hence, we used investment in sustainability by external stakeholders (Ameer & Othman, 2012; Gotschol, De Giovanni, & Esposito Vinzi, 2014), vision of sustainability (Savitz & Weber, 2013), environmentally friendly transport modes (Ageron, Gunasekaran, & Spalanzani, 2012), periodic communication (Soh & Goh, 2007), and redesign to achieve eco-friendliness (Savitz & Weber, 2013).

The three aspects of TBL performance were measured using scales from the literature. As argued by Atu (2013), "the challenge isn't defining the Triple bottom line, rather it is in its measurement" (p. 31). Economic performance is usually well understood and often expressed in terms of sales growth, profits, return on investment (ROI), shareholder value, or amount of taxes paid (Hubbard, 2009;

Savitz & Weber, 2013). Two measures were used to identify the economic benefits of an SS&OP process: employee satisfaction and community relationships (Hubbard, 2009). Social performance is defined as the impact that a company and its suppliers has on both internal employees and external communities (Hubbard, 2009). Social performance can be narrowed to product or process aspects that affect employee health and safety, community welfare and development, and product innovation (Savitz & Weber, 2013). We therefore selected scales for social performance that corresponded to employee welfare, corporate social responsibility, and product innovation. Environmental performance relates to the consumption of energy and other resources (e.g., land and water), as well as the footprint that companies leave behind as a result of their operations (e.g., waste, air emissions, and chemical residues; Savitz & Weber, 2013). Our scales thus measured the reduction of air emissions and energy used, minimization of hazardous waste, and reduction of environmental accidents (Gimenez et al., 2012; Yusuf, Sarhadi, & Gunasekaran, 1999). Tables 2a, 2b, and 2c summarize the items used to measure the constructs.

3.3 | Limitations of method

Although our study collected data from 120 respondents in China's primary and secondary sectors with manufacturing allied retailing, we accept this is a relatively small sample size considering the population. The sample size may restrict the generalizability of the results. Although not our original intention, the sample data were gathered primarily from managers working in operational functions, such as purchasing, manufacturing, and supply management. Ideally, we would have liked to collect data equally from all departments involved in the S&OP process, including finance, marketing, and sales; however, response rates were lower for these functions. Furthermore, our study relied primarily on subjective, self-reported data. A lack of triangulation of data source therefore may lead to potential reliability and validity issues.

4 | DATA ANALYSIS AND RESULTS

We ensured that our model satisfied all methodological tests, including reliability analysis, convergent and discriminant validity, and confirmatory factor analysis (CFA). Two tests were performed to check for the presence of multicollinearity or correlation among the variables: the Kaiser-Meyer-Olkin (KMO) measure for determining sampling adequacy and Bartlett's test of sphericity for the presence of correlation. The KMO was 0.895, which was greater than the minimum acceptable value of 0.5 (Kaiser, 1974). The score for Bartlett's test of sphericity, which indicates the strength of the relationship among variables, was 1,396.69, with significance beyond the 0.000 level. Moreover, all the constructs were assessed for reliability by using Cronbach's alpha. A coefficient alpha value of 0.70 is generally used as a threshold value (Hair et al., 2011); all the coefficient alpha

TABLE 2a Sustainability enabling variables

Construct	Code	Item	Source
Organizational planning integrating the views of internal and external stakeholders (OP)	OP1	We plan for a fast and reliable delivery of our products (e.g., on-time deliveries).	Gotschol et al. (2014); Slaper and Hall (2011); Beamon (1999); Nidumolu, Prahalad and Rangaswami (2009); Ageron et al. (2012); Ganesi (1998); Grimson and Pyke (2007); (Soh & Goh, 2007), Hubbard (2009); Atu (2013); Savitz and Weber (2013); Carter and Jennings (2002);
	OP3	We have introduced planning mechanisms that best meet service level targets.	
	OP4	We have implemented planning methods that reduce the trade-off between production planning and the resources defined in the budget.	
	OP5	We build operations plan to adjust financial plan, with input from sales and marketing.	
	OP6	We have a good understanding of our supplier capacities and limitations (e.g., scarce inventory and future plant shutdowns).	
	OP7	We have knowledge about our supplier flexibility.	
	OP8	Our company has adopted a sales and operation planning team.	
Collaboration between internal functions and external stakeholder groups (CIE)	CIE1	We ask information to our suppliers about their commitment to sustainability issues (e.g., waste reduction goals).	
	CIE3	We have frequent meetings with both our major suppliers and customers.	
	CIE4	When dealing with our suppliers we use inter-organizational information systems to track variations in customer demand.	
IT integration between focal firm and suppliers (IT)	IT1	The process of integration focuses on profit maximization for the entire company.	
	IT2	Capacity constraints are incorporated in our sales plans and pricing strategies.	
	IT3	We use information technology to address sustainability information (e.g., ESP).	
	IT4	We have introduced information systems that enable transparency between us and our partners.	
	IT5	Our company employs real-time, integrated solutions that optimize both sales and operations decisions.	
	IT6	Our company is supported by integrated supply-demand planning technology.	
	IT7	When dealing with our suppliers, we use interorganizational information systems to track variations in customer demand.	

values were considered satisfactory in terms of reliability, ranging from 0.839 to 0.876. Table 3 reports the Cronbach's alpha for each construct.

The validity of the constructs was checked and assessed in terms of convergent validity and discriminant validity. Convergent validity examines the magnitude of correlations between the observed variables or item measures of a latent variable (Gefen, Straub, & Boudreau, 2000). Two aspects were used to assess convergent validity: the average variance extracted (AVE) of each construct and composite reliability (CR). Table 3 shows the standardized CFA loadings for the

scale items, AVE, and CR, indicating that all items load well at 0.7 or greater at $p < 0.01$ on their posited constructs, and that the AVE and CR exceeded their criterion level. The AVE values for each construct were higher than the proposed threshold of 0.5, which explains more than half of the indicator variance. The CR as a measure for internal consistency was higher than the expected value of 0.7 (Hair et al., 2011). These results indicate that the conditions for convergent validity were met. Discriminant validity assesses the degree of uniqueness achieved from item measures or indicators in defining a latent variable (Gefen, 2003). To test discriminant validity, we compared the

TABLE 2b Sustainable sales and operations planning variables

Construct	Code	Item	Source
Sustainable sales and operations planning process (SSOP)	SSOP1	We are able to anticipate future trends and develop new sustainable solutions (e.g., foresee the rise in gas prices and develop a hybrid technology).	Grimson and Pyke (2007); (Soh & Goh, 2007), Savitz and Weber (2013);
	SSOP2	We have established goals, procedures and KPIs that address social, economic and environmental issues.	
	SSOP3	We share ideas, information, and resources on sustainability issues, that is, we have a vision of sustainability.	
	SSOP4	We make investments and expenditures in sustainability programs.	
	SSOP5	We develop sustainable offerings or redesign existing ones to become eco-friendly.	
	SSOP6	We have introduced periodic meetings that encourages internal communication around sustainability	
	SSOP7	We and our partners use environmentally friendly transportation	

TABLE 2c Performance variables

Construct	Code	Item	Source
Financial performance variable (FP)	FP1	Our current economic performance, in terms of sales, is much better than the one of our main competitor/s.	Savitz and Weber (2013); Hubbard (2009); Atu (2013); Hubbard (2009)
	FP2	Our current economic performance, in terms of returns on investment, is much better than the one of our main competitor/s.	
	FP3	We have positive economic impacts on the community in generating local contracts.	
	FP4	We have positive economic impacts on the community in job creation.	
	FP5	We benefit from economic incentives by the government to protect the environment.	
Social performance variable (SP)	SP1	We and our suppliers have improved labour standards and conditions.	
	SP2	We have strong relationships with our employees.	
	SP3	We have strong relationships with the communities in which we operate.	
	SP4	Our company is engaged in philanthropic investments.	
	SP5	We work with our customers to develop new and better products/services.	
Environmental performance variable (EP)	EP1	We have reduced air emissions.	
	EP2	We have reduced the amount of energy used (e.g., water and electronic power).	
	EP3	We have minimized hazardous wastes.	
	EP4	We have reduced the frequency for environmental accidents.	
	EP5	We use renewable energy sources.	

TABLE 3 Measurement model statistics

Construct	Code	Loading	Cronbach's alpha	Average variance extracted	Composite reliability
OP	OP1	0.62	0.84	0.51	0.88
	OP3	0.73			
	OP4	0.83			
	OP5	0.76			
	OP6	0.65			
	OP7	0.74			
	OP8	0.63			
CIE	CIE1	0.7	0.72	0.62	0.82
	CIE3	0.75			
	CIE4	0.71			
IT	IT1	0.51	0.84	0.52	0.88
	IT2	0.62			
	IT3	0.72			
	IT4	0.76			
	IT5	0.83			
	IT6	0.78			
	IT7	0.81			
SSOP	SSOP1	0.63	0.85	0.55	0.89
	SSOP2	0.81			
	SSOP3	0.82			
	SSOP4	0.82			
	SSOP5	0.84			
	SSOP6	0.57			
	SSOP7	0.71			
FP	FP1	0.71	0.8	0.55	0.86
	FP2	0.70			
	FP3	0.87			
	FP4	0.80			
	FP5	0.63			
SP	SP1	0.78	0.83	0.59	0.88
	SP2	0.84			
	SP3	0.81			
	SP4	0.69			
	SP5	0.72			
EP	EP1	0.92	0.88	0.69	0.90
	EP2	0.90			
	EP3	0.88			
	EP4	0.84			
	EP5	0.59			

Note: All loadings are significant at $p < 0.01$

Abbreviations: CIE, collaboration between internal functions and external stakeholder groups; EP, environmental performance variable; FP, financial performance variable; IT, information technology integration between focal firm and suppliers; OP, organizational planning integrating the views of internal and external stakeholders; SP, social performance variable; SSOP, sustainable sales and operations planning process.

CFA models, in one of which the correlation of a pair of latent constructs is constrained and in another of which the correlation may vary. In statistical terms, the square root of AVE for each construct should exceed all correlations between that and any other latent

variable (Fornell & Larcker, 1981). Table 4 shows that all our constructs are discriminant.

We analyzed our model by using partial least square based SEM, which we ran using SmartPLS. However, like most other multivariate

TABLE 4 Discriminant validity

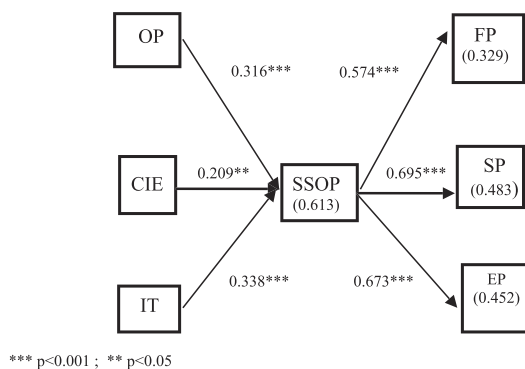
Construct	CIE	EP	FP	IT	OP	SP	SSOP
CIE	0.80						
EP	0.47	0.83					
FP	0.45	0.47	0.75				
IT	0.80	0.46	0.46	0.72			
OP	0.72	0.46	0.42	0.67	0.71		
SP	0.48	0.67	0.70	0.49	0.49	0.77	
SSOP	0.72	0.67	0.57	0.71	0.71	0.70	0.75

Note: Squared root of the average variance extracted (AVE) are on the diagonal.

Abbreviations: CIE, collaboration between internal functions and external stakeholder groups; EP, environmental performance variable; FP, financial performance variable; IT, information technology integration between focal firm and suppliers; OP, organizational planning integrating the views of internal and external stakeholders; SP, social performance variable; SSOP, sustainable sales and operations planning process.

procedures, exploratory factor analysis is essentially descriptive and as such is difficult, if not impossible, to use for hypothesis testing. Therefore, using factor analysis in a confirmatory fashion is more appropriate for testing structural models at later stages (Anderson & Gerbing, 1988). We performed CFA to analyze the data and measurement model. We used SEM, which takes a confirmatory approach to analyze structural theory bearing on some phenomena (Byrne, 2016). SEM has been widely applied in the operations management, marketing, and social science literature. Many researchers recognized SEM as a second generation technique (e.g., Zhu & Kraemer, 2002). To check the fitness of the model, we tested the variance inflation factor (VIF); this measures the extent to which the variation of estimated coefficients increases to the case of no correlation among variables. In our case the VIF is 2.62, which is well below the critical threshold criterion of 10, hence, the model was considered acceptable. Figure 2 presents the results of our path model; these indicate positive support of our four hypotheses.

Specifically, H1, H3, and H4a–c suggest a positive relationship at 1% significance level between the enablers of an SS&OP process and the three TBL performance measures. However, collaboration between internal functions and external stakeholder groups (H2) is

**FIGURE 2** Path model

supportive only at 5% significance level, compared with organizational planning (H1) and IT integration (H3). This finding suggests that simply focusing on collaboration between the focal firm and its suppliers may not be sufficient when developing an SS&OP process. Our findings indicate that supply chain partners need to be involved directly in the S&OP process, and this is achieved by integrating IT systems. An integrated IT system provides supply chain partners with real-time demand information, allowing them to effectively plan production and distribution processes. Importantly, our data suggest that external stakeholders need to be integrated at both the strategic planning level and the operational process level to positively affect triple bottom performance. Although the literature has established that conventional S&OP processes positively affect economic performance (Danese et al., 2017; Thomé et al., 2012b; Tchokogué, Nollet, Merminod, Paché, & Goupil, 2018), our findings suggest that the integration of external stakeholders at the planning and process levels positively affects social, economic, and environmental performance.

5 | DISCUSSION

The companies in our study identified SS&OP as a means for addressing the environmental, social, and economic issues they face on a day-to-day basis. Our country of study, China, has a large number of state-owned enterprises and government officials were identified as key external stakeholders. The Chinese government announced as part of its 5-year plan (2016–2020) targets for reducing greenhouse gas emissions, improving air and water quality, and increasing the use of nonfossil power sources (International Energy Agency, 2016). Survey respondents felt that the integration of government officials in the S&OP process would ensure that their company was supporting the country's environmental and social goals. Government officials were often located on company premises, and their integration in the S&OP process was seen by survey respondents as a necessary and logical step towards an SS&OP process.

The involvement of NGOs in S&OP meetings was not seen across all industries. For example, in the machinery and equipment manufacturing industry, which tends to have lower levels of media attention and campaigning from pressure groups, NGO involvement in the S&OP process was found to be a low priority. However, for industries with high levels of media attention and oversight by external bodies (i.e., oil and gas, retail, agribusiness, and pharmaceuticals), we found evidence of high levels of NGO and community actor involvement in the S&OP process. Businesses in these industries tend to have high levels of regulatory oversight from Chinese government agencies and survey respondents felt that addressing regulatory concerns was a primary motivator for moving to SS&OP process. We also found examples of operations managers developing demand plans with suppliers in order to anticipate changes in consumer preferences for environmentally and socially responsible products. The firms in our study tended to use locally based Chinese suppliers, which allowed for face-to-face interactions and the development of close buyer–supplier relationships.

Our findings suggest that the transition from a conventional to an SS&OP process requires integrating the views of internal and external stakeholders in the organizational planning process, with the support of integrated IT systems (H1 and H3). This finding suggests that companies should conduct joint planning with external stakeholders to challenge internal decisions and force pro-environmental and social change in the firm. The finding corroborates previous studies that emphasize the need for collaborative processes, sophisticated IT platforms, and integration between functional activities to create a more accurate demand response that considers the sustainability needs of customers (Collin & Lorenzin, 2006). However, our findings also indicate that an integrated IT system, in isolation, cannot facilitate an SS&OP process. Instead, we found that information sharing facilitated collaboration and communication between internal and external stakeholders groups. This finding supports Dao, Langella, and Carbo (2011) who argued that IT is critical in enabling firms to deliver sustainable values to stakeholders and concurrently create value and a sustained competitive advantage for themselves. Specifically, software applications that enhance information visibility between supply chain partners and information sharing about sustainability issues during the planning process (i.e., enterprise resource planning) are key determinants of firm sustainability (Dao et al., 2011). Similar studies have reported that collaborative planning and integrated information systems (i.e., Hadaya & Cassivi, 2007) provide firms with more reliable information on supplier activities; this ultimately improves the quality and accountability of supply and logistics plans.

The findings also revealed the need to involve the finance function in an SS&OP process. The finance function was found to play a critical role in ensuring that the company's economic activities were aligned with environmental and social programs. Survey respondents stressed that although social and environmental initiatives were urgently needed in China's manufacturing sector, such programs would not succeed if their companies were not profitable. Our findings therefore suggest that organizational financial plans are positively related to an SS&OP process. This finding supports Chase (2013) who argued that the financial plan should guide the other functional plans and thus requires collaboration, governance, guiding principles, and enabling technology.

6 | CONTRIBUTION AND CONCLUSIONS

6.1 | Theoretical contribution

This paper contributes to theory by combining the key tenets of life cycle theory and stakeholder theory to explain how organizations can transition to an SS&OP process. By drawing on life cycle theory, we have built the argument that the conventional S&OP process is internally focused and myopic and, over time, leads to path dependencies. In the conventional S&OP process, internal stakeholders (employees and managers) focus on cost reduction and sales maximization to the exclusion of the environment and society. The inward facing nature of the conventional S&OP processes sets the

organization on a predetermined course that is static and leads to structural inertia.

The paper builds on life cycle theory by finding that firms can break free from structural inertia through the inclusion of external stakeholder groups in the S&OP process. External stakeholders challenge the status quo and prompt organizational change. For example, NGOs and community groups were found to question the environmental and social performance of the firms in our study and apply pressure to change operational processes. This was particularly the case in industries with high degrees of media scrutiny (retail, oil and gas, and agri-business). Another key external force that prompted a move to an SS&OP process was government; an influencing factor not often discussed in the S&OP literature. Businesses with high degrees of regulatory oversight, particularly those in high polluting industries, stated that changes in environmental and social legislation (health and safety) were a primary motivator for moving to an SS&OP process.

Our finding suggests that firms need to balance environment and social initiatives with economic outcomes, where oversight is provided by the finance function. If an SS&OP process leads to environment and social performance improvements, but loses the firm money over the longer term, it will not be financially sustainable and will be discarded by the firm. We stress that a successful SS&OP process will require the development of collaborative capabilities between internal and external stakeholders. A conventional S&OP process becomes sustainable when the organization integrates the views of external stakeholders to break structural inertia in order to prompt pro-environmental and social change.

6.2 | Managerial implications

The paper contributes to managerial thinking by examining the relationship between internal and external stakeholder integration, collaboration, and TBL performance. To the best of our knowledge, the existing literature has yet to empirically measure the relationship between S&OP processes and TBL performance. Our results indicate that collaborative activities, such as frequent meetings with external stakeholders to understand their environmental and social concerns, are positively related to the TBL performance. This result somewhat contradicts Nakano's (2009) research, which revealed a positive relationship between internal collaborative and forecasting planning and operational performance, but failed to demonstrate the same with external collaboration. Instead, we observed a positive relationship between the enablers of organizational planning, IT integration, and collaboration between internal and external stakeholders on TBL performance. We stress that all three enablers must be present to realize positive environmental, social, and economic performance. Our results corroborate previous research findings that highlight the importance of collaboration between supply chain partners, but suggest that collaboration is a necessary but individually insufficient input (Kleindorfer, Singhal, & Van Wassenhove, 2005). We find that collaborative efforts combined with IT integration and joint planning are

necessary to positively influence TBL performance. We call on managers to prioritize the integration of relevant stakeholders, including government and nongovernment actors, as part of move towards a more SS&OP process.

6.3 | Limitations and future avenues for research

We consider the findings of this study in light of its limitations. Although our study collected data from 120 respondents in China's primary and secondary sectors, we accept this is a relatively small sample size considering the population. Future studies should expand the scope of the survey to provide equal coverage to all S&OP functions and aim for a larger sample size to enhance generalizability. Furthermore, our study examined China, the second largest economy in the world. We call on future researchers to examine the validity of our findings by gathering data from other economies such as those in Africa or Latin America. We expect that doing so may lead other exciting findings about the transition to an SS&OP process.

Few operations and supply chain scholars apply process-based theories when attempting to understand the intricacies of the S&OP process. We believe life cycle theory opens many possible avenues for future research on SS&OP processes. For example, future research could study the interconnected stages of the S&OP process and how path dependency leads to structural inertia over time. Scholars could also examine in greater depth how external stakeholder actions forces change within the S&OP process, using qualitative case study methods. For example, scholars could study how external pressures drive change and how such change positively or negatively, influences TBL performance. Such studies could use in-depth case studies of companies in industries with high levels of media attention and oversight by external bodies (oil and gas, retail, agribusiness, and pharmaceuticals).

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